

Aerobatics Course & Notes

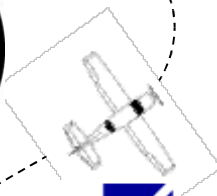
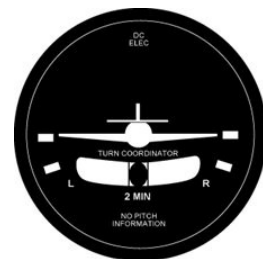
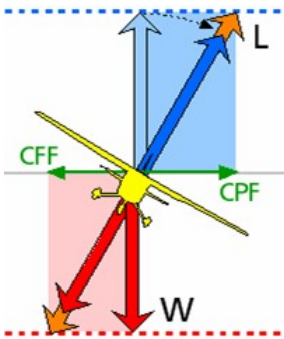




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Reference Material

- Aerobatics Neil Williams
- Flight Unlimited Muller and Carson
- Basic Aerobatics Campbell and Tempest
- Basic Aerobatics Mike Goulian
- Fly for Fun Bill Thomas
- *Aviation Medicine and Other Human Factors for Pilots* Ewing



Aerobatics Training Course

General

The objective of the flying training courses conducted by Eagle Flight Training is to qualify a person to conduct aerobatic flight operations in suitable aerobatic aircraft, legally, safely and within the privileges and limitations of the appropriate pilot licence.

Aerobatic Rating (A)

Subject to CAR 61.555 Privileges and limitations, the holder of an Aerobatics Rating may conduct maneuvers by day:

- (a) at least 3000 feet above the surface while carrying passengers; and
- (b) at least 1500 feet above the surface while not carrying passengers; and
- (c) below 1500 feet above the surface, while not carrying passengers, when authorized by the holder of an aviation recreation organization certificate issued under Part 149 where the certificate authorizes the holder to organize aviation events.

61.557 Recency requirements

- (a) Except as provided in paragraph (b), the holder of an aerobatic flight rating shall not exercise the privileges of that rating after 2 years from the date of issue unless, within the previous 2 years, they have demonstrated their competency in accordance with the requirements of 61.551(a)(3) and a record to that effect has been entered in the holder's logbook.
- (b) A person who completes the demonstration required by paragraph (a) within the calendar month before or after the date on which it is required is deemed to have completed the demonstration on the required date.

Minimum Requirements for Issue

61.551 Eligibility requirements

- (a) To be eligible for an aerobatic flight rating a person shall—
 - (1) have satisfactorily completed an aerobatics ground course
 - (2) have satisfactorily completed an aerobatics flight training course
 - (3) have demonstrated competency in aerobatics to a 141 approved instructor.



Aerobatics Training Course

Flying Training- Aerobatics Rating

Aerobatic Rating/ General Flying Phase

The objective of these phases of the flying training course is to qualify a person to conduct private flying operations, specifically the carriage of passengers whilst conducting aerobatics, legally and safely under supervision.

This school recommends that student pilots acquire an approved home study kit and undertake an approved course in the required aeronautical knowledge training as soon as possible after enrolment. The CFI or ground/flight instructor will advise the student on suitable courses, which are compatible with CAA requirements and the schools training course.

The course integrates the aeronautical knowledge training and ground and air instruction to achieve the aims set out in the first paragraph above.

Ground Training:

This is an integrated course and students are required to pass the following aeronautical knowledge test/ examinations as indicated.

- Pass flight test rules and procedures test
- Pass technical and emergency tests associated with training aircraft
- Pass flight radio telephone theory and practical tests where applicable
- Prior to first solo
- A school initiated oral/written progress test or appropriate aeronautical knowledge

- Prior to the General Flying Progress Test:
- A school initiated basic aeronautical knowledge examinations (BAK).
- Pass weight and balance and performance test.
- Pass human performance and limitations.

Ground training will be under the control and supervision of the CFI.

Prior to any air practice a preflight briefing will be carried out. Upon completion of each air practice flight a thorough debriefing will be carried out.



Aerobatics Training Course

Flying Training- Aerobatics Rating

Aerobatic Rating/ General Flying Phase

Air Training:

1. The Syllabus of instruction as laid down in this section provides a comprehensive coverage of all normal aerobatic piloting techniques and procedures, however the following points should be noted:
 - a) The lessons are in sequences to logically follow each other as general guide. In practice, individual students may benefit from a deviation from the sequence and this must be at the discretion of the instructor.
 - b) Regardless of (1) a) above, a student must have completed and reached a safe standard of operation prior to solo flight.
 - c) The time periods indicated for practice of each sequence are for guidance only. Revision of previous sequences will be usual in all periods.

2. Before a student pilot is permitted to operate a company aircraft on solo flights, he/she must have:
 - a) at minimum a valid class 2 medical
 - b) A pass in the school initiated oral/written progress test of appropriate aeronautical knowledge
 - c) A minimum of 3 hours
 - d) Written authorization from a company approved flight instructor. This authorization will specifically detail each sequence which the student is approved to practice and may take the form of the instructors signature in the flight authorization column of the flight authorization sheet.

1. Staff instructors are reminded that the following requirements are mandatory:
 - a) Dual checks to be carried out prior to the second and third solo flights
 - b) Dual checks to be carried out should 14 days have elapsed since the students last flight.
 - c) No solo on any flying sequence, unless the student has demonstrated in a dual exercise that he/she can safely practice solo and his/her progress sheet is endorsed accordingly.



Aerobatic Lesson Plans

Introduction to Aerobatic Flight:

Ground Briefing- 1.0 hour duration The Instructor will brief the student prior to the first aerobatic training flight using the approved Eagle Flight Training briefings which will include the following items:

- Objective of the Lesson
- Considerations/ Human Factors and Airmanship
 - The Physiology of Manoeuvring Flight
 - How does an Aircraft Manoeuvre
 - Physiological Symptoms of Load Factor
 - The Body and Sensing of Motion
 - How to cope with 'G'
 - Stress, Sickness and Aerobatics
 - Personal Preflight
 - Airframe and Aerodynamics
 - Engine and Mechanical Limitations
 - Unusual Attitude Recovery (both vertical and inverted positions)
- Air Exercise (Pertinent information for the flight)

Air Exercise- 0.8 hour duration (through demonstration and practice)

Instructors will complete the aerobatic training flight **only after completing** the appropriate briefing which will be indicated in a signature in the student record folder.

- Preflight inspection
- Taxiing
- Take off and departure to appropriate area
- Turning – Medium and Steep turning
- Unusual Attitude Recovery *demonstration* from vertical and inverted positions
- Unusual Attitude Recovery *student to practice* from vertical and inverted positions
- Return to base via the appropriate route
- Landing and taxi to base
- Post flight inspection

Post Flight Ground Briefing- 5-10 minutes duration

The Instructor will debrief the student on the specific aspects of flight assessing particular lesson objectives with the students.

The Instructor is to assess whether the student will repeat the lesson or continue to the next lesson and circle the appropriate box at the bottom of the student debrief sheet.



Aerobatic Lesson Plans

Spinning

Ground Briefing- 1.0 hour duration

The Instructor will brief the student prior to the first aerobatic training flight using the approved Eagle Flight Training briefings which will include the following items:

- Objective of the Lesson
- Considerations
 - Definition of Spinning/ Autorotation/ Spiral Dive
 - Characteristics and Recognition of a Spin
 - Causes of a Spin
- Principles of Flight
 - Forces in a Spin
 - Stages of a Spin
 - Centre of Gravity Position during Spinning
 - Use of Power when Spinning
 - Use of Ailerons during a Spin
 - IAS during Spinning
 - Recovery from a Spin
- Engine Handling
 - Engine and Mechanical Limitations
- Airmanship/Human Factors
 - Airframe and Aerodynamics
 - How to cope with 'G'
 - Stress, Sickness and Aerobatics
 - Personal Preflight
- Air Exercise (Pertinent information for the flight)

Air Exercise- 1.0 hour duration

Instructors will complete the aerobatic training flight **only after completing** the appropriate briefing which will be indicated through a signature in the student record folder.

- Preflight walk around
- Taxiing
- Take off and departure to appropriate area
- Revision of Unusual Attitude Recovery both vertical and inverted positions
- Introduction to Spinning- *Instructor to demonstration*
- Return to base via the appropriate route
- Landing and Taxi to base
- Post flight walk around

Post Flight Ground Briefing- 5-10 minutes duration

The Instructor will debrief the student on the specific aspects of flight assessing particular lesson objectives.

The Instructor is to assess whether the student will repeat the lesson or continue to the next lesson and circle the appropriate box at the bottom of the student debrief sheet.



Aerobatics Lesson Plans

The Loop

Ground Briefing- 1.0 hour duration

The Instructor will brief the student prior to the aerobatic training flight using the approved Eagle Flight Training briefings which will include the following items:

- Objective of the Lesson
- Considerations
 - Definition of a Loop
 - Forces in a Loop
 - Airspeed Considerations
- Aircraft Management
 - Engine and Mechanical Limitations
- Airmanship/Human Factors
 - Airframe and Aerodynamics
 - How to cope with 'G'
 - Stress, Sickness and Aerobatics
 - Personal Preflight
- Air Exercise
 - Unusual Attitude Recovery (both vertical and inverted positions)
 - Air Exercise (pertinent information regarding the Loop Lesson)

Air Exercise- 1.0 hour duration

Instructors will complete the aerobatic training flight **only after completing** the appropriate briefing which will be indicated through a signature in the student record folder.

- Preflight walk around
- Taxiing
- Take off and departure to appropriate area
- Revision of Unusual Attitude Recovery both vertical and inverted positions
- Introduction to Loops - *Instructor to demonstration and student to practice*
- Return to base via the appropriate route
- Landing and Taxi to base
- Post flight walk around

Post Flight Ground Briefing- 5-10 minutes duration

The Instructor will debrief the student on the specific aspects of flight assessing particular lesson objectives.

The Instructor is to assess whether the student will repeat the lesson or continue to the next lesson and circle the appropriate box at the bottom of the student debrief sheet.



Aerobatics Lesson Plans

Revision Exercise

Ground Briefing- 5-10 minutes duration

The Instructor will brief the student prior to the aerobatic training flight using the approved Eagle Flight Training briefings which will include the following items:

Unusual Attitude Recovery (both vertical and inverted positions)

Air Exercise (pertinent information regarding to the specific exercises to be completed during the flight)

Air Exercise- 1.0 hour duration

Instructors will complete the aerobatic training flight **only after completing** the appropriate briefing which will be indicated through a signature in the student record folder.

The student will be briefed on the particular exercise required prior to flight including the following:

- Preflight walk around
- Taxiing
- Take off and departure to appropriate area
- Revision of required maneuvers based on student proficiency
- Return to base via the appropriate route
- Landing and Taxi to base
- Post flight walk around

Post Flight Ground Briefing- 5-10 minutes duration

The Instructor will debrief the student on the specific aspects of flight assessing particular lesson objectives.

The Instructor is to assess whether the student will repeat the lesson or continue to the next lesson and circle the appropriate box at the bottom of the student debrief sheet.



Aerobatics Lesson Plans

The Aileron Roll

Ground Briefing- 1.0 hour duration

The Instructor will brief the student prior to the aerobatic training flight using the approved Eagle Flight Training briefings which will include the following items:

- Objectives of the Lesson
- Principles of Flight
 - Forces in the manoeuvre
- Considerations
 - Changing Airspeed
 - Effects of Controls through different stages of the maneuver
- Engine Handling
 - Engine and Mechanical Limitations
- Human Factors/ Airmanship
 - Airframe and Aerodynamics
 - Stress, Sickness and Aerobatics
 - Personal Preflight
- Air Exercise (pertinent information regarding the Aileron Roll Lesson)

Air Exercise- 1.0 hour duration

Instructors will complete the aerobatic training flight **only after completing** the appropriate briefing which will be indicated through a signature in the student record folder.

- Preflight walk around
- Taxiing
- Take off and departure to appropriate area
- Revision of Loops
- Introduction to Aileron Rolls- *Instructor to demonstration and student to practice*
- Return to base via the appropriate route
- Landing and Taxi to base
- Post flight walk around

Post Flight Ground Briefing- 5-10 minutes duration

The Instructor will debrief the student on the specific aspects of flight assessing particular lesson objectives.

The Instructor is to assess whether the student will repeat the lesson or continue to the next lesson and circle the appropriate box at the bottom of the student debrief sheet.



Aerobatics Lesson Plans

Revision Exercise

Ground Briefing- 5-10 minutes duration

The Instructor will brief the student prior to the aerobatic training flight using the approved Eagle Flight Training briefings which will include the following items:

Unusual Attitude Recovery (both vertical and inverted positions)

Air Exercise (pertinent information regarding to the specific exercises to be completed during the flight)

Air Exercise- 1.0 hour duration

Instructors will complete the aerobatic training flight **only after completing** the appropriate briefing which will be indicated through a signature in the student record folder.

The student will be briefed on the particular exercise required prior to flight including the following:

- Preflight walk around
- Taxiing
- Take off and departure to appropriate area
- Revision of required manoeuvre based on student proficiency
- Return to base via the appropriate route
- Landing and Taxi to base
- Post flight walk around

Post Flight Ground Briefing- 5-10 minutes duration

The Instructor will debrief the student on the specific aspects of flight assessing particular lesson objectives.

The Instructor is to assess whether the student will repeat the lesson or continue to the next lesson and circle the appropriate box at the bottom of the student debrief sheet.



Aerobatics Lesson Plans

The Barrel Roll

Ground Briefing- 1.0 hour duration

The Instructor will brief the student prior to the aerobatic training flight using the approved Eagle Flight Training briefings which will include the following items:

- Objectives of the Lesson
- Principles of Flight
 - Forces in the manoeuvre
- Considerations
 - Changing Airspeed
 - Effects of Controls through different stages of the maneuver
- Engine Handling
 - Engine and Mechanical Limitations
- Human Factors/ Airmanship
 - Airframe and Aerodynamics
 - Stress, Sickness and Aerobatics
 - Personal Preflight
- Air Exercise (pertinent information regarding the Barrel Roll Lesson)

Air Exercise- 1.0 hour duration

Instructors will complete the aerobatic training flight **only after completing** the appropriate briefing which will be indicated through a signature in the student record folder.

- Preflight walk around
- Taxiing
- Take off and departure to appropriate area
- Revision of Aileron Rolls
- Introduction to Barrel Roll- *Instructor to demonstration and student to practice*
- Return to base via the appropriate route
- Landing and Taxi to base
- Post flight walk around

Post Flight Ground Briefing- 5-10 minutes duration

The Instructor will debrief the student on the specific aspects of flight assessing particular lesson objectives.

The Instructor is to assess whether the student will repeat the lesson or continue to the next lesson and circle the appropriate box at the bottom of the student debrief sheet.



Aerobatics Lesson Plans

Revision Exercise

Ground Briefing- 5-10 minutes duration

The Instructor will brief the student prior to the aerobatic training flight using the approved Eagle Flight Training briefings which will include the following items:

Unusual Attitude Recovery (both vertical and inverted positions)

Air Exercise (pertinent information regarding the specific exercises to be completed during the flight)

Air Exercise- 1.0 hour duration

Instructors will complete the aerobatic training flight **only after completing** the appropriate briefing which will be indicated through a signature in the student record folder.

The student will be briefed on the particular exercise required prior to flight including the following:

- Preflight walk around
- Taxiing
- Take off and departure to appropriate area
- Revision of required manoeuvre based on student proficiency
- Return to base via the appropriate route
- Landing and Taxi to base
- Post flight walk around

Post Flight Ground Briefing- 5-10 minutes duration

The Instructor will debrief the student on the specific aspects of flight assessing particular lesson objectives.

The Instructor is to assess whether the student will repeat the lesson or continue to the next lesson and circle the appropriate box at the bottom of the student debrief sheet.



Aerobatics Lesson Plans

The Stall Turn

Ground Briefing- 1 hour duration

The Instructor will brief the student prior to the first aerobatic training flight using the approved Eagle Flight Training briefings which will include the following items:

- Objectives of the Lesson
- Principles of Flight
 - Description of the manoeuvre
- Considerations
 - Effects of Controls through at different stages of the maneuver in both directions
 - Inertia
 - Revision of Vertical Unusual Attitudes
- Engine Handling
 - Engine and Mechanical Limitations
- Human Factors/ Airmanship
 - Airframe and Aerodynamics
 - Stress, Sickness and Aerobatics
 - Personal Preflight
- Air Exercise (pertinent information regarding the stall turn Lesson)

Air Exercise- 1.0 hour duration

Instructors will complete the aerobatic training flight **only after completing** the appropriate briefing which will be indicated through a signature in the student record folder.

- Preflight walk around
- Taxiing
- Take off and departure to appropriate area
- Revision Barrel Rolls
- Introduction to Stall Turns - *Instructor to demonstration and student to practice*
- Return to base via the appropriate route
- Landing and Taxi to base
- Post flight walk around

Post Flight Ground Briefing- 5-10 minutes duration

The Instructor will debrief the student on the specific aspects of flight assessing particular lesson objectives.

The Instructor is to assess whether the student will repeat the lesson or continue to the next lesson and circle the appropriate box at the bottom of the student debrief sheet.



Aerobatics Lesson Plans

Combinations

Ground Briefing- 1 hour duration

The Instructor will brief the student prior to the aerobatic training flight using the approved Eagle Flight Training briefings which will include the following items:

- Objectives of the Lesson
- Considerations
 - Revision of 5 basic manoeuvres
 - Changing Airspeed and energy
- Engine Handling
 - Airframe and Aerodynamics
 - Engine and Mechanical Limitations
- Human Factors/ Airmanship
 - Stress, Sickness and Aerobatics
 - Personal Preflight
- Air Exercise (pertinent information regarding the Combination Lesson)

Air Exercise- 1.0 hour duration

Instructors will complete the aerobatic training flight **only after completing** the appropriate briefing which will be indicated through a signature in the student record folder.

- Preflight walk around
- Taxiing
- Take off and departure to appropriate area
- Revision of all 5 basic manoeuvres
- Introduction to Combinations- *Instructor to demonstration and student to practice*
- Return to base via the appropriate route
- Landing and Taxi to base
- Post flight walk around

Post Flight Ground Briefing- 5-10 minutes duration

The Instructor will debrief the student on the specific aspects of the flight assessing particular lesson objectives.

The Instructor is to assess whether the student will repeat the lesson or continue to the next lesson and circle the appropriate box at the bottom of the student debrief sheet.



Aerobatics Lesson Plans

Revision Exercise

Ground Briefing- 5-10 minutes duration

The Instructor will brief the student prior to the aerobatic training flight using the approved Eagle Flight Training briefings which will include the following items:

Unusual Attitude Recovery (both vertical and inverted positions)

Air Exercise (pertinent information regarding the specific exercises to be completed during the flight)

Air Exercise- 1.0 hour duration

Instructors will complete the aerobatic training flight **only after completing** the appropriate briefing which will be indicated through a signature in the student record folder.

The student will be briefed on the particular exercise required prior to flight including the following:

- Preflight walk around
- Taxiing
- Take off and departure to appropriate area
- Revision of required manoeuvres based on student proficiency
- Return to base via the appropriate route
- Landing and Taxi to base
- Post flight walk around
-

Post Flight Ground Briefing- 5-10 minutes duration

The Instructor will debrief the student on the specific aspects of flight assessing particular lesson objectives.

The Instructor is to assess whether the student will repeat the lesson or continue to the next lesson and circle the appropriate box at the bottom of the student debrief sheet.



Aerobatics Lesson Plans

Revision Exercise

Ground Briefing- 5-10 minutes duration

The Instructor will brief the student prior to the aerobatic training flight using the approved Eagle Flight Training briefings which will include the following items:

Unusual Attitude Recovery (both vertical and inverted positions)

Air Exercise (pertinent information regarding the specific exercises to be completed during the flight)

Air Exercise- 1.0 hour duration

Instructors will complete the aerobatic training flight **only after completing** the appropriate briefing which will be indicated through a signature in the student record folder.

The student will be briefed on the particular exercise required prior to flight including the following:

- Preflight walk around
- Taxiing
- Take off and departure to appropriate area
- Revision of required manoeuvres based on student proficiency
- Return to base via the appropriate route
- Landing and Taxi to base
- Post flight walk around

Post Flight Ground Briefing- 5-10 minutes duration

The Instructor will debrief the student on the specific aspects of flight assessing particular lesson objectives.

The Instructor is to assess whether the student will repeat the lesson or continue to the next lesson and circle the appropriate box at the bottom of the student debrief sheet.



Aerobatics Lesson Plans

Competency Check

Ground Briefing- 5-10 minutes duration

The Instructor will brief the student prior to the competency check which will include the following items:

- Objectives of the Competency Check
- Air Exercise (pertinent information regarding the Competency Check)

Air Exercise- 1.0 hour duration

Instructors will complete the aerobatic competency check **only after completing** the appropriate

briefing which will be indicated through a signature in the student record folder.

- Preflight walk around
- Taxiing
- Take off and departure to appropriate area
- Revision of Unusual Attitude Recovery both vertical and inverted positions
- Revision of 5 basic maneuvers, and combinations
- Return to base via the appropriate route
- Landing and Taxi to base
- Post flight walk around

Post Flight Ground Briefing- 5-10 minutes duration

The Instructor will debrief the student on the specific aspects of the flight assessing particular manoeuvres.

The Instructor is to assess whether the student has met the required standard or is to receive further training . Which will be indicated by circling the appropriate box at the bottom of the student debrief sheet.

If the assessment is satisfactory the Instructor will also endorse the students log book with the approved Eagle Flight Training Aerobatics Sticker by signing at the bottom of the sticker with the issue date and the date of the next competency check.

(Note only limitations must also be entered on the sticker).



Aerobatics Competency Check Requirements

Competency Check

Prior to the issue of the students must have completed the following Requirements:

No	Requirements	√
1	18 years or older	
2	At least class 2 medical	
3	Current Pilots Licence	
4	Received Required Flight training	
5	Passed Written exams	
6	Log book stickers completed	
7	Flight test Booked	
8	Log Book Checked	
9		



Aerobatics Basic Aeronautical Knowledge Examination (BAK)

1. What is the Maximum and Minimum G limits for your aircraft?
2. What is G LOC?
3. What is Rolling G?
4. What is VNE for your aircraft?
5. What is the minimum height (AGL) an aerobatics rated pilot may perform aerobatics whilst carrying passengers? Is there any exceptions to this rule?
6. How do you recover from an Inverted Attitude.
7. What type of Flaps does your aerobatic aircraft have installed? Do they have any specific G limitations?
8. Can you fly aerobatics in the normal category in this aircraft?
9. What effects would you suffer from under positive G loading?
10. What effects would you suffer from under negative G loading?
11. How can G tolerance be increased?
12. What is the problem with tail slides?
13. What is Va?
14. What is the Va for your aircraft?
15. State the full spin recovery technique?
16. What is the fuel consumption rate of your aircraft?
17. What is the Maximum oil capacity for your aircraft?
18. What is the minimum oil capacity for you aircraft?
19. Once rated how long before you must be rechecked to fly aerobatics in order to carry passengers?
20. What is the maximum aerobatic category weight for your aircraft?